REVIEWING PHONOLOGICAL VARIATIONS IN PAKISTANI AND CHINESE ENGLISH: CHALLENGES FOR CHINESE LISTENER COMPREHENSION

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Abstract
This review study examines the phonological variations between PakE and ChE and how these variations influence the comprehension of Chinese listeners. It analyzes various studies that include vowel and consonant variation in PakE and ChE, the influence of regional languages such as Urdu and Mandarin, and other linguistic features that hinder Chinese listeners from comprehending PakE. The study collates findings from various sources, which is enlightening in terms of how the phonological variations shape communication across the two forms of English and how Chinese listeners adapt to such variations. The study provides insights into improving mutual intelligibility through pedagogical strategies and speech technology advancements.

Keywords: Pakistani English, Chinese English, Phonological variation, Listener comprehension, Mutual intelligibility

1 Introduction

The concept of World Englishes illustrates the flexibility and variations of the spread of the language. These native varieties of localized English arise as features from the people's native languages, cultural norms, and communicative practices are implemented. Pakistani English (PakE) and Chinese English (ChE) are examples in this regard, as both are influenced by the linguistic and cultural contexts of each country, ultimately leading to some phonological characteristics (Arjmandi & Behroozmand, 2024).

PakE has emerged from the impact of Pakistan's multilingual environment, which uses Urdu, Punjabi, Pashto, and Sindhi widely. This has influenced phonological features such as aspirated consonants, syllable-timed rhythm, and vowel substitutions that do not follow the norms of native speakers of English. Similarly, ChE has developed under the influence of Chinese tonal languages such as Mandarin and Cantonese, and this is evident in the development of tonal intonation patterns, consonant cluster simplification, and vowel shifts. These features mark the phonological identity of ChE (Défossez et al., 2023).

English is a lingua franca or means of communication between individuals who do not share a native language for various purposes such as education, business, and social purposes across the globe. With increasing international educational exchange, doing business, or collaboration work, such as CPEC between Pakistan and China, English is an essential means of mutual intelligibility. However, because PakE and ChE differ in phonology, communication becomes difficult due to pronunciation differences, wrong accent, stress misplacement, and poor articulation. As a very important tool in global communication, understanding these variations in phonologies is a factor that should further improve mutual intelligibility. Beyond just language education or intercultural communication, though, the

influence of diverse accents in developing technology has immense implications (Diehl et al., 2004).

1.1 Significance of the Study

Understanding how phonological variations affect listening comprehension is essential in enhancing communication in multilingual interactions. To Chinese listeners interacting with PakE speakers, the differences in pronunciation, stress patterns, or intonation may create problems that may affect effective understanding. It does not only occur in social contacts but in academic and professional ones as well, because of the demand for proper communication. The implication of the findings involves sharpening language teaching practices. Hence, learners adequately prepare for appropriate use in real life, developing speech technologies accommodating distinct features of the English accent, and facilitating inclusion at the international level. Improvement of global communication and mutual understanding arises from the resolution of these issues.

1.2 Research Gap

Despite the extensive study on World Englishes, much work remains to be done to fill the gaps in the literature concerning specific interactions between, for example, PakE and ChE. Phonological variations are mostly found in individualized studies of each English variety and not on the impact of variation on mutual intelligibility in cross-cultural encounters (Kapnoula et al., 2021).

Most studies on PakE have primarily explored its phonological features, such as retroflex consonants and vowel length contrasts (Kurbanova et al., 2022), but have not examined how these features affect comprehension by non-native speakers, particularly those from tonal language backgrounds like Chinese. Similarly, research on ChE has emphasized its unique pronunciation patterns, including tonal intonation (Winn & Teece, 2021) and consonant simplifications (Johnson & Sjerps, 2021), without addressing how speakers of other English varieties perceive these patterns. Further, though mutual intelligibility is an important field of research in global English communication (Baese-Berk et al., 2020), there is very little work on how Chinese listeners understand PakE speakers in the real world. This is very relevant to settings such as the academic or professional spheres where the effectiveness of communication is the very basis for cooperation (Rahne et al., 2021). This lack of comprehensive reviews to synthesize various studies creates the biggest knowledge gap. There isn't holistic insight in current literature about the problem of phonological variations in PakE and ChE and actual practical information as to how better listening could be facilitated (Nagle & Baese-Berk, 2022).

1.3 Objective

This review analyzes phonological variation in PakE and ChE as well as how this impacts comprehension for the Chinese listener. Specifically, this discussion explores features like differences in vowel and consonant phonemes, effects of native language on pronunciation, and other critical phonological features. By looking at these elements, the review will try to provide a comprehensive understanding of the challenges posed by these variations and propose strategies to enhance communication in multilingual and multicultural contexts.

2 Methodology

This review will apply the PRISMA framework (Moher et al., 2009) to systematically analyze and synthesize the available studies on the influence of Pakistani English (PakE)

pronunciation on Chinese listeners. The methodology adopted is designed in a way to ensures transparency, reproducibility, and a high level of quality assessment in the included studies. Figure 1 shows the phase diagram with the selection of the papers for the current review performed under the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analysis) framework for reporting systematic reviews (Moher et al. 2009). Figure 1 shows the phase diagram with the several steps used in the current article. The preliminary database search yielded 150 articles. After eliminating the duplicates, 100 articles were left for title and abstract screening. The full-text reviews were then performed on the remaining articles, during which the inclusion and exclusion criteria were applied. In the end, 75 high-quality studies were selected for inclusion in the synthesis.
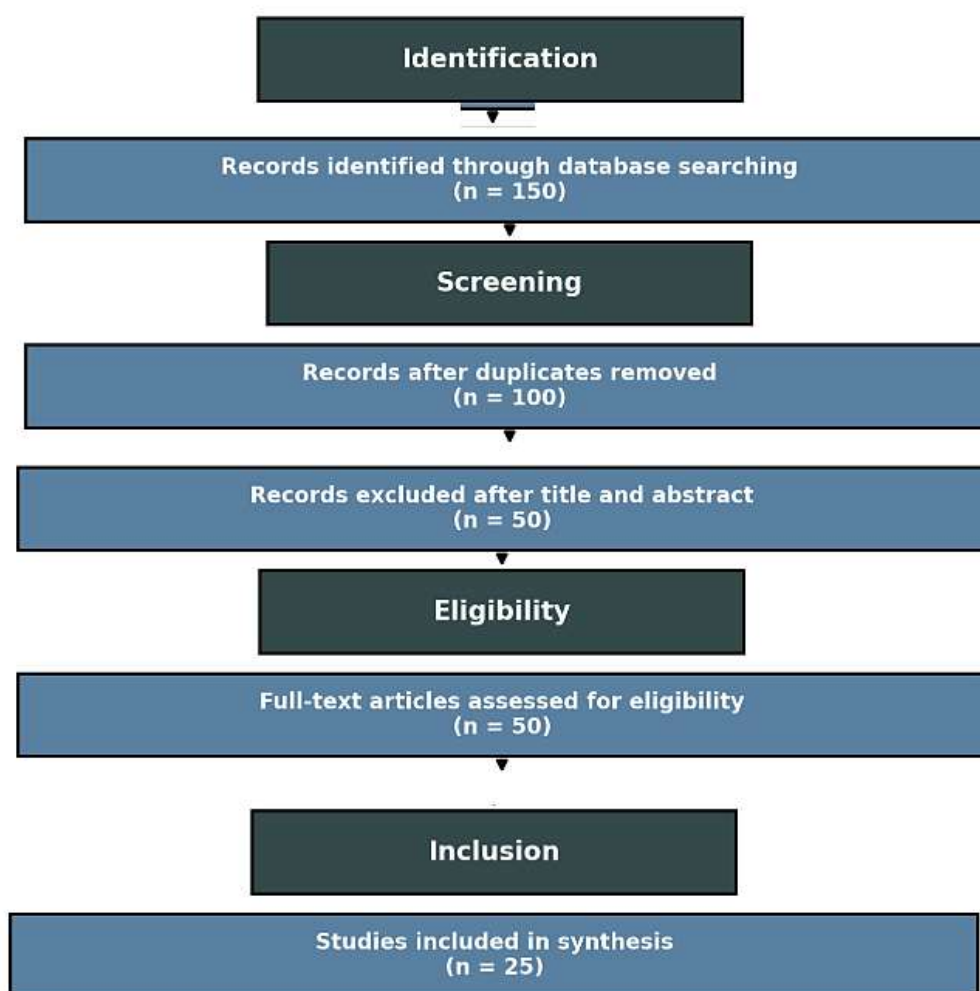

Identification

Records identified through database searching
(n = 150)

Screening

Records after duplicates removed
(n = 100)

Records excluded after title and abstract
(n = 50)

Eligibility

Full-text articles assessed for eligibility
(n = 50)

Inclusion

Studies included in synthesis
(n = 25)

Figure 1 PRISMA flow chart

2.1 Research Aims and Questions

The primary focus of this paper is to describe the phonological differences between PakE and ChE, comparing how these phonological differences will affect listener comprehensibility specifically for Chinese. The review looks to answer these research questions.

Q1) What are the phonological variations in vowel and consonantal features between PakE and ChE?

Q2) How will these phonological variations affect the comprehensibility and intelligibility of Chinese listeners?

2.2 Eligibility Criteria

To ensure the relevance and quality of the studies, specific eligibility criteria were established.
Inclusion Criteria:
- Studies that focused on the phonological features of PakE and ChE, particularly vowels and consonants.
- Research that considered the impact of regional linguistic structures on English pronunciation in Pakistan and China.
- Studies that explored listener comprehension and intelligibility concerning phonological features.
- Empirical, theoretical, or mixed-method studies published in peer-reviewed English-language journals.

Exclusion Criteria:
- Studies that were not relevant to PakE, ChE, or phonological analysis.
- Articles in languages other than English.
- Research not on intelligibility or listener comprehension.

2.3 Search Strategy

A systematic search was done across several academic databases, such as JSTOR, Google Scholar, PubMed, and Web of Science. The search was done in December 2024 using a set of keywords and Boolean operators, such as:
- "Pakistani English phonology" AND "Chinese English phonology"
- Vowel features OR Consonantal variations AND intelligibility
- "Regional influences on English pronunciation"

Grey literature, such as theses and dissertations, was also consulted to ensure that all avenues were covered. The review was limited to studies published up to 2023 to include the most recent findings.

2.4 Paper Selection

The preliminary database search yielded 150 articles published up to 2023. After eliminating the duplicates, 100 articles were left for title and abstract screening. The full-text reviews

were then performed on the remaining articles, during which the inclusion and exclusion criteria were applied. In the end, 75 high-quality studies were selected for inclusion in the synthesis.

The screening process was divided into two major stages:

- Exclusion after Title and Abstract Review (n = 50): Excluded due to irrelevance or failure to meet the research objectives.
- Exclusion after Full-Text Review (n = 25): Reasons for exclusion included, but were not limited to, publications in languages other than English, lack of adequate methodological rigor, and lack of relevance to the research questions.

2.5 Quality Assessment

The quality of the studies that passed the inclusion criteria was appraised against the PRISMA framework. Three key areas were regarded during the assessment:

- Adherence of the research objectives of the study to the review questions set up for general purposes.
- The methodological strength and validity of the findings reported in the study.
- The intelligibility and succinctness of the phonological analysis.

Studies that failed to meet the criteria were excluded to ensure that the review's conclusions were based on reliable and rigorous evidence.

2.6 Data Extraction

Questionnaires using standardized data extraction forms were adapted for the collection of relevant information in the included studies. This form was aimed at critical phonological features that influence intelligibility in Pakistani English (PakE) and Chinese English (ChE) and also captured regional and dialectal influences on English pronunciation in Pakistan and China and the most salient features of sociolinguistic factors like education, language policies, and exposure to native English.

2.7 Data Synthesis

The guidelines of the present synthesis extracted data from included studies towards monitoring recurring themes, trends, as well as contrasts across the research. Qualitative analysis includes phonological patterns such as vowel shifts (like monophthongization and diphthongization) and consonant realizations (like voicing and devoicing). The comparative analysis includes the differences in vowel and consonant productions between PakE and ChE, along with examining each regional linguistic influence on pronunciation. Sociolinguistic Insights looked into the sociolinguistic factors that affect the phonological features of PakE and ChE, including education, language policy, and exposure to native English.

3 Results

3.1 Linguistic Features of Pakistani English (PakE)

Vowels

PakE features a different vowel system from the rest of the English varieties, exhibiting invariant as well as variable vowel realizations. Several linguistic factors, including the

phonological structure of the Urdu language and regional speech patterns, affect the vowel system of PakE (Bilal & Asghar, 2023).

The data on the word list shows two clear groups of vowels in PakE (**Table 1**). Group 1 is the group of invariant vowel realizations, which do not vary among the Pakistani speakers. This group is further divided into two subgroups according to their similarity to RP. Group 1A contains vowels that are very similar to their RP counterparts and no variation was observed. For example, words like "KIT," "HAPPY," and "DRESS" in PakE exhibit the same vowel sounds as in RP. This group includes 15 of the 29 analyzed words, covering both monophthongs, such as [ɪ] and [æ], and diphthongs, such as [aɪ] and [ɔɪ] (Farooq et al., 2022). In contrast, Group 1B consists of vowels that show no variation within Pakistani speakers but differ from RP. For example, the vowel in "horses" is pronounced [ɪ] instead of the RP's [ə] for instance, and the vowel in "letter" is pronounced [ʌ] instead of the schwa [ə]. The schwa sound is often replaced by a full vowel in Pakistani speech, for example, as in "letter" and "comma." Moreover, vowels from the "NURSE" and "LOT" lexical sets, including [ʌ] and [ɔ:], are replaced by other vowels that often take their cue from the Urdu vowel system (Halo et al., 2024; Syed & Atta, 2021). This pattern of substitution fits with earlier research on rhoticity and vowel change in South Asian English varieties. The second category, Group 2, comprises vowels where the realization varies with Pakistani speakers. These vowels appear as both a tense and lax version (Syed & Bibi, 2024). For example, the vowel in "FOOT" can take on the variants [ü] and [u:], whereas the vowel in "BATH" can range between [a:] and [æ]. Diphthongs of the type presented in "FACE," "GOAT," and "GOAL" present variation between a diphthong and a monophthong (English, 2023). At other times, vowels are raised or otherwise undergo monophthongization, as in the diphthongs of "SQUARE" and "CURE" (Salbrina et al., 2024). The overall vowel system of PakE therefore manifests a complex play between invariant and variable vowel realization, an outcome of native linguistic factors combined with international norms for English (Schönefeld et al., 2024).

Table 1 Vowels in PakE

Lexical Item	PakE Realization	RP Realization	References
Group 1A: Similar to RP			
KIT	[ɪ]	[ɪ]	(Ulbrich, 2024; Wijekoon et al., 2024; Wu & Ji, 2023; Yu, 2023)
HAPPY	[ɪ]	[ɪ]	
THOUGHT	[ɔ:]	[ɔ:]	
NORTH	[ɔ:]	[ɔ:]	
FORCE	[ɔ:]	[ɔ:]	
PALM	[a:]	[a:]	
DRESS	[e]	[e]	
TRAP	[æ]	[æ]	
STRUT	[ʌ]	[ʌ]	
FLEECE	[i:]	[i:]	
Diphthongs			
PRICE	[aɪ]	[aɪ]	(Cao, 2024; Curdt-Christiansen & Morgia, 2018; Dabouis & Fournier, 2024; Kurbanova et al., 2022;
CHOICE	[ɔɪ]	[ɔɪ]	
MOUTH	[au]	[au]	

			Rahman, 2020b; Rahne et al., 2021)
Group 1B: Different from RP			
HORSES	[ɪ]	[ə]	(Rahman, 2020a, 2020b; Ramzan et al., 2023; Yan, 2024; Yang & Oh, 2020; Yang et al., 2024; Yuan et al., 2024; Yuqing et al., 2024; Zainab et al., 2024)
LETTER	[ʌ]	[ə]	
COMMA	[ʌ]	[ə]	
NURSE	[ʌ]	[ɜ:]	
LOT	[ɔ:]	[ɔ]	
Group 2: Vowels Exhibiting Variation			
FOOT	[ü] ~ [u:]	[ü]	(Abbas & Iqbal, 2018; Ali & David, 2021; Défossez et al., 2023; DeFrancis, 2023)
BATH	[a:] ~ [æ]	[a:]	
CLOTH	[ɔ] ~ [ɔ:] ~ [o:]	[ɔ]	
Diphthongs			
FACE	[e:] ~ [eɪ]	[eɪ]	
GOAT	[O:] ~ [əü] ~ [u]	[əü]	
GOAL	[O:] ~ [əü]	[əü]	
NEAR	[ɪə] ~ [eə]	[ɪə]	
SQUARE	[eə] ~ [əɪ] ~ [aɪ]	[eə]	
CURE	[jüə] ~ [jeɔ:] ~ [eɔ:]	[jüə:]	

Consonants

Pakistani English (PakE) displays several distinctive phonetic and phonological features, above all in the realization of consonants, determined by the first languages (L1) of its speakers and by the historical use of English orthography. One such feature is the realization of voiceless stops (/p t k/) without aspiration in all positions, even in stressed positions where aspiration is present in British English (BE) (Syed & Atta, 2021). This lack of aspiration is regarded by BE speakers as "near native-like" or "different but understandable" but not fully "native-like." Of the stops, it is more likely that velar stops (/k/) are aspirated than labial (/p/) or coronal (/t/) stops, which is attributed to a shorter distance between the vocal folds and the velar place of articulation as well as the broader contact area of articulators for the velar stop (Farooq & Mahmood, 2018). Nevertheless, PakE speakers typically are not able to generate aspirated allophones of voiceless stops due to historical dependence on orthography based on English, where aspiration is not represented (Asghar et al., 2020). As soon as the native English-speaking people of Pakistan left the country in 1947, PakE aspirate contrast neutralization intensified due to speakers' overdependence on writing English rather than input on spoken English. In English, aspiration is an allophonic feature, but in Pakistani languages, it is phonemic. Consequently, Pakistani speakers perceive aspirated and unaspirated stops as distinct phonemes, making the accurate production of aspirated English stops particularly challenging (Siddiqui & Keerio, 2019).

Another distinctive feature of PakE is the retroflex articulation of the English coronal stop /t/. Unlike most other varieties, in PakE, the sound /t/ is produced more like a retroflex than an alveolar consonant. The retroflection also causes the adjacent vowels to drop to a much lower third formant, but with the /st/ cluster of steel, the /t/ is not retroflexed. This is because the articulatory demands of the preceding /s/ will prevent retroflex articulation, thus producing a longer VOT for /t/ in these clusters than for retroflex /t/ in syllable-initial positions, such as in teaching. The production of voiced stops (/b d g/) in PakE is also affected by the first languages of the speakers, where pre-voicing is a common feature. In PakE, voiced stops are invariably pre-voiced and the length of pre-voicing varies by place of articulation (Islam, 2020). For example, /b/ has the longest duration of pre-voicing, whereas /g/ has the shortest (Sheeraz & Abid, 2019). Such reliance on pre-voicing can create communication difficulties with BE speakers, because words like peak, tale, and keys, pronounced with short-lag VOT by PakE speakers, might be interpreted as beak, dale, and geese, and vice versa. In addition, the retroflex articulation of coronal stops /t/ and /d/ is another key feature that differentiates PakE from BE; that is, the alveolar production for these stops in BE is not characteristic of PakE (Rahman, 2020b). The retroflection influences both the quality of the stop itself and also the immediately following vowel quality, yet again setting PakE off from BE. But the retroflexion of /t/ is avoided in /st/ clusters as /s/ exerts an articulatory constraint from the previous position (Abbas & Iqbal, 2018).

The production of PakE dental fricatives /θ/ and /ð/ is also nontypical. In this respect, PakE differs from BE norms, since the sounds are produced as dental stops ([t̪ʰ] and [d̪], respectively), with the [+continuant] feature of BE fricatives replaced by [-continuant] while retaining the [distributed] feature (Yasmin & Sohail, 2018). The voiceless dental fricative /θ/ is generally realized as a voiceless aspirated dental stop ([t̪ʰ]), and the voiced dental fricative /ð/ as a pre-voiced dental stop ([d̪]). Such replacement is influenced by English orthography, where letters represent sounds, and the phonetic character of Pakistani languages where, as it is found with /ð/, voicing precedes (Yasmin & Sohail, 2018). However, they fail to produce them since in BE, such sound often occurs as a fricative. For instance, /θ/ is sometimes heard as /f/ by PakE speakers, and /ð/ may be heard as /z/, /v/, or other similar sounds because of acoustic similarities between dental fricatives and other labial or coronal fricatives. Spectrogram analyses confirm that PakE speakers produce /θ/ and /ð/ as stops rather than fricatives, lacking the turbulent noise characteristic of BE fricatives. This difference highlights a significant phonetic and phonological divergence between PakE and British English (Curdt-Christiansen & Morgia, 2018).

PakE speakers also have distinct productions of the English affricates, velar nasal /ŋ/, and the laryngeal fricative /h/. PakE speakers tend to produce affricates as stops where English affricates occur, /tʃ/ and /dʒ/, a reflection of a strong classification as being equivalent, shaped by their L1. PakE speakers can easily hear and distinguish affricates, but they consistently fail to distinguish BE affricates from their corresponding stops. The velar nasal /ŋ/, although found in some Pakistani languages, is often realized as an alveolar nasal /n/ followed by a velar stop /g/ or /k/. For instance, words such as sing and pink are pronounced as [sing] and [pink] instead of [siŋ] and [piŋk] (Abbas & Iqbal, 2018; Gargesh, 2019; Yasmin et al., 2019). This is a pattern caused by the presence of English orthography where the letter is not allocated particularly to the velar nasal that gives it the new, independent pronunciation. The same pattern also comes from an L1 effect as Pakistani Saraiki speakers produce, as PakE speakers in the speech, the English voiceless laryngeal fricative /h/ as the

voiced fricative /ɦ/. These distinctive phonetic and phonological features highlight the important role of L1 transfer and orthographic influence in PakE and show the necessity for further research to investigate these patterns with larger participant groups (Zainab et al., 2024).

Table 2 Pakistani English's primary consonantal variations.

Feature	Description	References
Voiceless Stops /p t k/	Voiceless stops are realized without aspiration in all positions, including stressed positions. Velar stops (/k/) are more likely to be aspirated than labial (/p/) or coronal (/t/) stops.	Syed & Atta (2021); Farooq & Mahmood (2018); Asghar et al. (2020)
Retroflex Articulation of /t/	/t/ is articulated as a retroflex rather than an alveolar consonant. Retroflex /t/ influences adjacent vowels, lowering their third formant.	Islam (2020); Sheeraz & Abid (2019); Abbas & Iqbal (2018)
Pre-voicing of Voiced Stops /b d g/	Voiced stops are invariably pre-voiced, with /b/ having the longest duration of pre-voicing, and /g/ having the shortest. This can lead to misinterpretation with BE speakers.	Sheeraz & Abid (2019); Rahman (2020b)
Dental Fricatives /θ/ and /ð/	/θ/ and /ð/ are realized as dental stops [t̪ʰ] and [d̪], with the [+continuant] feature of BE fricatives replaced by [-continuant].	Yasmin & Sohail (2018); Curdt-Christiansen & Morgia (2018)
Affricates /tʃ/ and /dʒ/	Affricates are produced as stops.	Yasmin et al. (2019)
Velar Nasal /ŋ/	Velar nasal /ŋ/ is often realized as an alveolar nasal /n/ followed by a velar stop /g/ or /k/, e.g., "sing" pronounced as [sing].	Abbas & Iqbal (2018); Gargesh (2019); Yasmin et al. (2019)
Voiceless Laryngeal Fricative /h/	Voiceless /h/ is produced as the voiced fricative /ɦ/ by some Pakistani Saraiki speakers.	Zainab et al. (2024)

3.2 Linguistic Features of Chinese English

Vowels

The variation found in Chinese English with vowels is substantial, especially as a result of regional variation and linguistic factors (Jia et al., 2006). For instance, in Yunnan, one of the most noticeable aspects is the realization of the British English STRUT vowel /ʌ/ as the American English LOT vowel /ɑ/, with pronunciations such as /dɑk/ for "duck." Epenthetic vowels are another major feature, where a schwa is inserted after final plosives or within consonant clusters(Mi et al., 2016). This feature is widespread in Central and Northern China, as well as Yunnan, but less common in Guangxi (Kwon & Starr, 2023a). Interestingly, such variations are not unique to Chinese English and are observed in other Asian English varieties, including Korean and Japanese English (Wang, 2023). Moreover, some findings mention epenthesis, like the insertion of a vowel into clusters or before nasal /n/, showing epenthetic vowels as yet another specific characteristic of Chinese English (**Table 3**).

Another common feature is that reduced vowels are not used for unstressed syllables; especially in function words, vowels are full (Zhang, 2021). This phenomenon is common in Northern and Central China, Yunnan, and Guangxi. In Guangxi, sometimes nasalized vowels appear, even without nasal consonant support, which might be evidence of the influence of the mother tongue of speakers (Kwon & Starr, 2023b; L. Wang et al., 2023). There is also another overlapping in the length between the FLEECE and KIT vowels in Guangxi (Y. Wang et al., 2023). Another area of interest is variation in diphthong realization, as the FACE vowel /eɪ/ in Yunnan often realizes as [ɑɪ], [iː], or [e], yielding pronunciations such as ['rɑɪzɪn] for "raising" or ['seftɪ] for "safety." The PRICE vowel /aɪ/ is also commonly monophthongized to [e], which yields pronunciations like [wel] for "while" and [tred] for "tried." Variation occurs with both vowels in about half of the tokens, and similar monophthongization has been reported for other non-native Englishes, including African Englishes (Wu & Ji, 2023).

Less common but notable alternations include the pronunciation of the NEAR vowel /ɪə/ as the SQUARE vowel [ɛə] and the SQUARE vowel as the NURSE vowel [ɜː]. Diphthong shortening, where diphthongs are realized as monophthongs when preceded by consonants, is attested among speakers from Northern China (Yu, 2023) and seems to be consonant with Mandarin phonotactics, where certain final consonants are banned (Huang et al., 2024). The structural influence of Mandarin syllables, typically CGVX with restricted final consonants like /n/, /ŋ/, and /ɻ/, might explain this phenomenon. While vowel variation is a constant feature of Chinese English, the specific forms of variation are determined by regional linguistic diversity, phonetic environment, and influence of native language phonology (Yang et al., 2024).

Table 3 Vowels in ChE

Vowel	Realization	References
STRUT /ʌ/	/ɑ/	
Epenthetic vowel	Schwa /ə/	(Abbas & Iqbal, 2018;
Absence of reduced vowels	Full vowels (e.g., /ɪ/, /ɛ/)	Ali et al., 2020; Islam,

Nasalized vowels	Nasalized (e.g., /ɑ̃ː/)	2020; Jia, 2023; Jia et al., 2006)
FLEECE /iː/	/ɪ/, /iː/ (overlap)	(Otto et al., 2023)
KIT /ɪ/	/iː/, /ɪ/ (overlap)	(Zhang, 2021)
FACE /eɪ/	[ɑɪ], [iː], [e]	(Ali et al., 2020; Farooq et al., 2022; Khan et al., 2023; Kwon & Starr, 2023b)
PRICE /aɪ/	[e]	
NEAR /ɪə/	/ɛə/	
SQUARE /ɛə/	/ɜː/	
Diphthong shortening	Reduced diphthongs (e.g., [aɪ] → [a])	

2.2 Consonants

Chinese English consonants vary significantly and, hence, are a subject of greater interest than vowels in linguistic studies (Kemej, 2024). The variation falls mainly into two categories: substitution, where a phoneme is realized as a different phone, and omission, where the phoneme is not pronounced. One example of variation is the realization of voiceless dental fricative /θ/ as voiceless alveolar fricative [s], which frequently occurs in Northern and Central China (71% of observations) and Yunnan (50%). In Guangxi, this is exceptionally uncommon. Realization of the voiced dental fricative /ð/ is region-dependent, often as [z] or [d] in Northern and Central China (Liu & Ayuso, 2021), while in Yunnan this realization was predominantly [z] and in Guangxi commonly [d] (Lavitskaya & Zagorodniuk, 2021).

Another substitution is the voiceless glottal fricative /h/ realized as [x], influenced by Pinyin spelling conventions and prevalent in Northern and Central China (Xiao et al., 2020). In Yunnan, a unique feature is the voiceless postalveolar fricative /ʃ/ pronounced as a voiceless palatal fricative /ç/ (Yang & Resendiz, 2024). The voiced postalveolar fricative /ʒ/ is realized as [ɹ] or [j] depending on the region, with [ɹ] being more common in Northern and Central China and [j] predominant in Yunnan (Yang et al., 2021). The voiced labiodental fricative /v/ often shifts to [w], though this is rare in Yunnan, especially in Guangxi. Furthermore, /l/ manifests three distinct forms: it can be replaced by [n], appear on the l-r continuum, or vocalize, mainly in Northern and Central China and Yunnan. Vocalizing /l/ often causes syllable codas to change into forms such as wolf as [wɒ] or [ʊf] and full as [fuː] (Shevchenko & Romanova, 2022).

Omissions are equally noticeable, such as the often-failed attempt to include final consonants, especially /t/ in words like hot afternoon, and the substitution of final consonants with glottal stops, as in duck pronounced [dʌʔ] (Gong et al., 2021). In Yunnan, the word-final /n/ is often omitted, with a schwa insertion (soon → [suː]; afternoon → [ɑːftə'nuːən]). Consonant clusters tend to be simplified in many places, especially final clusters, such as /st/ and past tense forms in /t/ or /d/, which are reduced up to 55%. Aspiration of voiceless stops, also strong, is seen especially in initial and cluster positions, often with vowel epenthesis (Li & Thompson, 2022).

Rhoticity in Chinese English is controversial, as education draws on either British or American English models. Even though British English has traditionally been the standard, both accents' features often surface in a single word, influenced by L1 preferences or

historical shifts in linguistic preference (Yang & Oh, 2020). Regional diversity and sociolinguistic factors add to the difficulty in determining whether observed variations are intrinsic to Chinese English or adaptations from its model varieties (Lan, 2020).

Table 4 phonetic variants of Chinese English consonants.

Feature	Description	References
Voiceless Dental Fricative /θ/	Realized as a voiceless alveolar fricative [s] in Northern and Central China (71%) and Yunnan (50%). Rare in Guangxi**.**	(Liu & Ayuso, 2021)
Voiced Dental Fricative /ð/	Region-dependent realization as [z] or [d]. Predominantly [z] in Yunnan and [d] in Guangxi.	(Lavitskaya& Zagorodniuk, 2021)
Voiceless Glottal Fricative /h/	Realized as [x], influenced by Pinyin spelling conventions, especially in Northern and Central China.	(Xiao et al., 2020)
Voiceless Postalveolar Fricative /ʃ/	Pronounced as voiceless palatal fricative /ç/ in Yunnan.	(Yang & Resendiz, 2024)
Voiced Postalveolar Fricative /ʒ/	Realized as [ɹ] (Northern & Central China) or [j] (Yunnan).	(Yang et al., 2021)
Voiced Labiodental Fricative /v/	Often shifts to [w], though rare in Yunnan, especially Guangxi.	(Yang & Oh, 2020).
Consonantal /l/	Can be replaced by [n], appear on the l-r continuum, or vocalized. Vocalized /l/ results in forms like "wolf" as [wɒ] or [ʊf], and "full" as [fuː].	(Shevchenko& Romanova, 2022).
Omission of Final Consonants	Final consonants, especially /t/, are often omitted (e.g., "hot afternoon"). In Yunnan, the word-final /n/ is omitted with a schwa (e.g., "soon" → [suː]).	(Gong et al., 2021)

Substitution of Final Consonants with Glottal Stops	Final consonants are substituted with glottal stops, e.g., "duck" pronounced as [dʌʔ].	(Gong et al., 2021)
Simplification of Consonant Clusters	Final consonant clusters, especially /st/ and past tense forms, are reduced by up to 55%.	(Gong et al., 2021)
Aspiration of Voiceless Stops	Aspiration of voiceless stops, especially in initial and cluster positions, with vowel epenthesis.	(Li & Thompson
Rhoticity	Controversial, with both British and American English features present, influenced by regional diversity and sociolinguistic factors.	(Yang & Oh, 2020) (Lan, 2020).

3.3 Comparison of phonological features in Pakistani English (pakE) and Chinese English (chE) and their impact on intelligibility

By considering the above detail, **Table 5** compares and contrasts the phonological features of PakE and ChE, with particular emphasis on how these differences have an impact on intelligibility for the Chinese listener. In consonantal features, PakE uses retroflex stops ([ʈ], [ɖ]) rather than the standard alveolar stops ([t], [d]), which are closer to Received Pronunciation (Johnson & Sjerps) and used in ChE. This retroflex articulation, shaped by regional languages in Pakistan, would likely confuse Chinese listeners to whom such sounds are not habitual. PakE replaces dental stops ([t̪], [d̪]) with English dental fricatives ([θ], [ð]), whereas ChE supplants them with [s] and [z]. While neither is standard RP, ChE speakers are more accustomed to dental stops than PakE is, thereby likely to cause greater intelligibility problems. In addition, PakE being rhotic, where [r] is pronounced in all contexts, whereas ChE has non-rhotic patterns, creates additional difficulties for Chinese listeners who are accustomed to a postvocalic [r] that is silent.

In PakE, for vowel features, full vowels in unstressed syllables tend to be maintained (like "letter" → [lettʌr]). ChE, however, frequently uses epenthetic schwa-like vowels in unstressed syllables, for example: "bag" → [bagə]. This difference in vowel treatment will sometimes introduce misunderstandings between PakE's full vowel retention and the vowel additions used in ChE. A remarkable feature of PakE is monophthongization: for example, the diphthong [eɪ] in "face" is monophthongized to [e]; whereas ChE tends to lengthen diphthongs. Such differences influence the overall acceptability of speech as more or less natural, so that PakE speakers may sound abrupt in monophthongizing a word compared with ChE speakers. Moreover, ChE often has difficulties with vowel length contrasts (for example, "ship" vs. "sheep"), and PakE tends to be inconsistent in preserving such contrasts, thereby creating further challenges to intelligibility.

Table 5 Comparison of Phonological Features in Pakistani English (PakE) and Chinese English (ChE) and Their Impact on Intelligibility

Feature	Pakistani English (PakE)	Chinese English (ChE)	Impact on Intelligibility	References
Consonants				
Retroflex Stops	Uses retroflex [ʈ] and [ɖ] for alveolar stops [t] and [d].	Do not use retroflex stops; alveolar stops are closer to RP English.	Retroflex sounds may confuse Chinese listeners unfamiliar with them.	(Ali & David, 2021; Ali et al., 2020)
Dentalization	Substitutes dental stops [t̪], [d̪] for [θ] (th in think) and [ð] (th in this).	Replaces [θ] and [ð] with [s] and [z] respectively (e.g., "this" → "zis").	Both groups deviate from RP, but PakE's stops are less familiar to ChE speakers.	(Langah, 2020; Larsen & Di Stasio, 2021)
v and w Distinction	v and w are allophones; often pronounced interchangeably (e.g., "wind" as [vɪnd] or [wɪnd]).	Struggles with v and w distinction; often merges them as [w] (e.g., "very" → "wery").	Interchangeable use in both can cause mutual intelligibility issues.	(Otto et al., 2023; Safdar, 2021; Spengler et al., 2021)
Rhoticity	Rhotic; [r] is pronounced in all contexts, including postvocalic (e.g., "car" → [ka:r]).	Non-rhotic; follows British English patterns with silent postvocalic [r] (e.g., "car" → [ka:]).	Rhotic pronunciation in PakE might be unfamiliar to ChE speakers.	(Ashraf et al., 2021)
Clear [l]	Always uses clear [l], even in positions where RP uses dark [ɫ] (e.g., "goal" → [go:l]).	Similar use of clear [l] in all contexts; lacks dark [ɫ].	Minimal impact as both accents exhibit similar treatment.	(Xu, 2020; Yang & Oh, 2020)

Table 6 Comparison of vowels in Pakistani English (PakE) and Chinese English (ChE) and Their Impact on Intelligibility

Vowels				References
Feature	**Pakistani English (PakE)**	**Chinese English (ChE)**	**Impact on Intelligibility**	
Schwa Reduction	Retains full vowels instead of schwas in unstressed syllables	Retains full vowels but adds extra schwa-like vowels after final	PakE's full vowels differ from ChE's vowel additions.	(Halo et al., 2024; Kurbanova et al., 2022)

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	(e.g., "letter" → [lettʌr], "comma" → [kɔmmʌ]).	consonants (e.g., "bag" → [bagə]).		
Mono-phthongization	Diphthongs like [eɪ] in "face" become monophthongs [e].	Does not systematically monophthongize; diphthongs may be overextended (e.g., "go" → [goʊ]).	PakE's monophthongization may seem abrupt to ChE speakers.	(Abbas & Iqbal, 2018; Arjmandi & Behroozmand, 2024)
Vowel Length Distinction	Maintains some vowel length contrasts but exhibits variability in tense-lax forms.	Struggles with long-short vowel contrasts (e.g., "ship" → "sheep").	Differences in vowel length may confuse both groups.	
TRAP	[æ]	Common realization as [ɑ] in some regions	Variations may affect mutual intelligibility, especially across regions.	(Abbas & Iqbal, 2018; Abbas et al., 2018; Ali & David, 2021; Arjmandi & Behroozmand, 2024; Cao, 2024; Dabouis & Fournier, 2024)
STRUT	[ʌ]	Common realization as [ʌ] or [ɑ]	Minimal impact; both groups may use similar sounds.	
FOOT	[ü] ~ [u:]	Common realization as [u] or [ʊ]	Variations could cause slight confusion, particularly for vowel quality.	
BATH	[æ] ~ [a:]	Often realized as [a] or [ɑ]	Variability could result in misunderstandings.	
NURSE	[ʌ]	Often realized as [ɜː] or [ɛə]	Differences may impact intelligibility for listeners expecting specific vowels.	(Farooq et al., 2022) (Kurbanova et al., 2022)
FLEECE	[i:]	[i:]	Minimal impact, both varieties use the same vowel.	
FACE	[eɪ] ~ [e]	Varies regionally with [e] or [iː]	Variation in [e] may cause slight confusion between varieties.	

3.4 Factors Influencing Phonological Changes in PakE and ChE

From the comparison, multiple interrelated factors that makeup pronunciation, listening comprehension, and overall varieties of intelligibility stem out of phonological differences

from PakE and ChE. The native languages spoken by people determine the kind of L1 exposure to any variety of L2, as do socio-educational supports of acquisition (Johnson & Babel, 2024).

When English is a learner's second language or L2, then both pronunciation and listening comprehension are highly affected. Pronunciation is affected by the native language because the sounds and rhythms of the first language interfere with the way they produce the English sounds. For instance, Chinese and Pakistani students may have problems pronouncing certain English sounds, which do not occur in their mother tongues. Examples include the English "th" sound or vowel differences like /æ/ vs. /ɛ/. Such pronunciation leads to non-native accents that may sometimes make it difficult for others to understand, especially if the pronunciation is not intelligible by native speakers of the English language (Gonzales, 2024). In addition, L2 learners may suffer from the pronunciation of some words with stress or intonation patterns that are different in their first language, possibly causing misunderstandings in speaking or listening contexts. Listening comprehension is also impacted when English is learned as an L2. The ability to understand spoken English depends on several factors, such as vocabulary knowledge, exposure to different accents, and familiarity with cultural and contextual cues. Learners may initially struggle to understand native speakers due to the speed of speech, different accents, or unfamiliar slang. Research indicates that L2 learners with limited vocabulary knowledge would find it challenging to recognize words in listening tasks, especially when the vocabulary used comprises phrasal verbs or idiomatic expressions (Ulbrich, 2024).

Furthermore, learners tend to use top-down processing more than bottom-up processing, where they make inferences based on context and world knowledge rather than just based on decoding the sounds and words heard. This can be challenging when listening to fast or unfamiliar speech. The format for listening tests can also influence L2 listening performance. As an example, multiple-choice questions are favored in large-scale listening tests about L2 learning because of their convenience, yet they could not represent authentic listening behaviors in most cases. Tests have different formats, which influence how L2 listeners perform on them. Some formats, such as previewed answers, are inherently more likely to promote a dependency on word recognition strategies; these strategies will not benefit their listening comprehension. Others, which involve summarizing what the student has heard, activate the learner to higher levels of cognitive ability simulate more realistic real-life listening tasks, and better represent an assessment of actual ability (Dabouis & Fournier, 2024).

Effect of Native Language on Pronunciation (Haidar & Fang, 2019)

The native languages greatly impact the production of English sounds among speakers of PakE and ChE. Among Pakistani speakers, the impact of Urdu and other regional languages introduces retroflex stops ([ʈ], [ɖ]) instead of alveolar stops ([t], [d]) as standard in RP. In ChE, there is no retroflex articulation as retroflex sounds do not occur in Mandarin Chinese and, thus, it has a closer approximation to RP's alveolar stops. Similarly, the dental fricatives ([θ], [ð]) are not found in either Urdu or Mandarin and have different replacements: PakE uses dental stops ([t̪], [d̪]), while ChE makes use of [s] and [z]. These replacements illustrate phonological gaps in the native languages and give different accents that may be confusing to unfamiliar listeners

As for vowels, PakE tends to monophthongize diphthongs (e.g., [eɪ] to [e]), whereas ChE maintains diphthongs but can hyperextend them (e.g., [oʊ] to [oː]). The vowel inventories of Urdu and Mandarin also have an impact on vowel realization because they lack some of the English vowel contrasts. For instance, the long-short vowel contrast (e.g., "sheep" vs. "ship") is not maintained as regularly in ChE, which can cause misunderstandings.

Challenges in Listening Comprehension

Listening comprehension is another domain where L1 interference and limited exposure to native or global English varieties pose difficulties. Stress, rhythm, and intonation patterns in English are often quite different from those in Urdu and Mandarin. For example, PakE speakers, who have been accustomed to rhotic pronunciations where post-vocalic [r] is pronounced (e.g., "car" → [kaːr]), may struggle to adapt to ChE's non-rhotic patterns, which are aligned with British English norms. Conversely, ChE speakers will find it challenging to understand rhotic sounds in PakE as they are not present in their native exposure to English.

Vocabulary knowledge and cultural familiarity also play critical roles in listening comprehension. Both PakE and ChE speakers may rely heavily on top-down processing—drawing on context and prior knowledge to infer meaning—when faced with unfamiliar accents, fast speech, or idiomatic expressions. This can be particularly problematic in cross-cultural interactions where mutual intelligibility depends on accurate bottom-up processing of speech sounds.

Educational and Multimedia Influence

The educational tools and techniques used to teach English also affect these phonological differences. In both Pakistan and China, traditional language teaching is typically on grammar and vocabulary to the detriment of phonetics and pronunciation. Listening and speaking skills are often ignored so learners are not properly equipped to handle real conversational situations. Testing formats such as multiple-choice listening questions seldom mirror real listening tasks; instead, they encourage surface-level comprehension strategies rather than deep listening (Wijekoon et al., 2024).

Video, captioning, and even the presence of multimedia will be of great support to the learners as visual and contextual clues promote comprehension. For instance, learners will read between lines through body language and facial expressions when the speech is fast or the accent is heavy. Media distractions are present while foreign accents influence the content of media sometimes interfering with the ability to comprehend rather than making it easier to understand, especially when the accents vary widely from the learner's native variety of English (Cao, 2024).

Broader Implications and Recommendations

These phonological differences reveal the dynamic and adaptive character of English as it interacts with diverse linguistic and cultural contexts. The understanding of these variations is crucial for successful cross-cultural communication. Pronunciation problems can be overcome by focused phonetics training, greater exposure to different English accents, and authentic listening tasks in educational settings that enhance mutual intelligibility.

Furthermore, using multimedia resources judiciously towards balanced audio-visual integration can further help facilitate the learning process in negating the complexities of understanding L2 English.

In conclusion, it is the interplay between native language influence, educational practices, and exposure to English that results in the phonological differences found between PakE and ChE. To bridge communication gaps and enrich global English interactions, these differences must be addressed through informed pedagogical approaches and increased cultural and linguistic awareness.

4   Conclusion

In summary, this review, based on the findings of 75 articles, reveals the considerable impact of both Pakistani and Chinese linguistic landscapes on their respective varieties of English. PakE development is deeply entrenched in historical, political, and cultural contexts that have shaped the subcontinent and its unique phonetic features that reflect local structures and practices of language. Similarly, Chinese English is shaped by the linguistic wealth of China and regional dialects that contribute to unique pronunciation patterns and challenges with mutual intelligibility.

Both PakE and ChE reflect the accommodative nature of the English language to different socio-cultural environments and serve as a tool of communication and identity. A comparison of these two varieties depicts how non-native influences may be represented by different phonetic features, which, although sometimes a nuisance to cross-cultural communication, constitute an added ornament to the tapestry of the global use of English. Future research will make a detailed study of those varieties paying attention to the different phonetic, lexical, as well as syntactic peculiarities in both contexts plus the processes of nativization as well as codification. It's only from such nuances and differences that communication barriers and mutual intelligibility are better addressed in today's global world where English takes on ever more lingua-franca forms.

4.1   Limitations of the Study

This review is based on 75 articles but might not cover all the relevant research, especially concerning regional differences. The study methodologies in terms of acoustic analysis and sociolinguistic surveys vary, which makes it difficult to compare the phonological features of PakE and ChE. It is focused on phonology and does not consider other linguistic factors such as syntax or pragmatics, which could also influence communication.

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